

Background information examples for the subject of Genetically Modified Organisms

Written By:

WholeFoods Magazine Staff

View more articles in:

- **Consumer Bulletin**

Genetically modified organisms (GMOs) are becoming more and more prominent in today's marketplace, so it is important to understand what they are and some of the issues they raise. A GMO plant has been genetically altered using genetic engineering techniques, and is commonly found in crops such as corn, soybeans, cotton and canola. In general, these plants are modified to express a resistance to herbicide, which can be beneficial to farmers, allowing for less work so more crops can be harvested. As of 2006, there were 102 million hectares of GM crops worldwide, and that number has only increased, with a 10% jump from 2007 to 2008 alone. In fact, the United States alone recently neared 60 million hectares (1).

It is important to be aware that, despite some advantages, there are numerous disadvantages that must be considered.

Food and Fuel Supporters of GMOs believe such crops help increase yield, which could help curtail skyrocketing food prices. In addition, GMOs could potentially be influential in the gas crisis. Alternatives such as increased use of biofuels (made from GMOs) seem to be a positive advantage because they could lessen the nation's dependence on oil as well as reduce greenhouse gas emissions. Although the use of biofuel has been expanding, many believe the full effects on the environment and elsewhere must be further researched. Lawrence Berkeley National Lab has published research that indicates that it takes more energy to produce ethanol from corn than the energy we get from the corn.

The international "food vs. fuel" debate has been another topic of great controversy in and of itself. Critics of biofuel worry that investment into the sector has driven up the price of food. Creating biofuels requires massive amounts of raw material, and although the land used by GM crops is a huge percentage of land farmed, the question remains whether ultimately using it for food or fuel is the best use of it, time and money. Many international organizations that track starvation in the world state that people do not usually die from the lack of food, but from the lack of access to food...starvation is not a food production problem, but an economic problem.

Genetic Pollution One of the major problems with GMOs is that they have no boundaries. Once planted, they run the risk of contaminating any conventional crops planted nearby. A survey reports that in the Midwest, where there are millions of acres of GM corn and soybean crops, up to 80% of organic farmers reported direct costs or damages resulting from genetic trespass (2). This trespassing can occur in a variety of common, natural ways, which makes keeping the GMOs on their own fields impossible. For example, winds (particularly high winds, but even breezes can be problematic) and water runoff are full of seeds and spores, and can easily bring GMOs to fields where they are not purposely grown.

Often, these seeds and spores will then implant themselves into soil and produce plants that are genetically altered—with the farmer having no idea his crops have been genetically polluted. Other sources of GMO contamination include commingling during harvest and cross-pollination, which is particularly rampant with corn (2). Farmers often hire combines to harvest their food, instead of using their own, and if these have not been cleaned well enough, residual GM grains from previous harvests can contaminate the crop. Something as small as a particle on a tarp is enough to cause contamination. There has been some talk of creating GMOs whose offspring would be sterile, thus eliminating many of these plants; as of yet there has been no great move to implement the modification on a large scale.

Lack of Labels Unlike the organic certification, there is no such thing as a GMO-free certification. In fact, products are not required by law to state whether or not they contain GMOs. In a world where 92% of the soybean crop is genetically modified and many products use soybean oil or corn syrup (GMOs comprise 80% of the corn planted), the chance of finding GMOs in food is incredibly high (2). Although it is impossible to tell by reading labels in your local grocery aisles, 65% of all their products have DNA-altered ingredients (3). Unfortunately, some organic products may even unknowingly contain GMOs, since U.S. organic rules do not require GMO testing. While all manufacturers are concerned with buying certified organic, not everyone knows about GMO contamination (2). Without requiring GMO labeling, knowing the true content of products can be difficult if information is disregarded or lost along the way.

A recent CBS/New York Times poll states that 53% of Americans say they won't buy food that has been genetically modified; avoiding GMOs is not an easy task, however (3). Without labeling, it is impossible to know the extent of any biotech contamination. And in creating GMOs, the DNA is often spliced with DNA from other organisms that could be detrimental to those with serious allergies or even those who are vegetarians. The Brazil nut was combined with soybeans for a time, until it produced too many allergic reactions (4). Although this particular combination has ceased, there is no telling what others exist, particularly when no one is legally compelled to say anything.

While the U.S. Food and Drug Administration and biotech giants claim there's no evidence that GMOs are anything but safe, food safety advocates want to know: how would we know, if the food is not labeled? (3). Many people are concerned that the lack of long-term testing on GMOs will be detrimental to the population—and the environment—in the years to come. As it stands now, more examples of GMO problems can be found in Jeffrey M. Smith's book *Seeds of Deception*, including gastrointestinal problems in humans (after similar issues found in the lab, though the GMO was passed) and the telltale sign of wild animals' refusal to eat GM crops.

Even with the difficulties presented by the lack of GMO labeling, many natural retailers try to screen out any products that contain GMOs; check with your local retailer to learn more. **WF**

References 1. "GM cultivation almost at 60 million hectares." www.GMO-compass.org, July 1, 2008. 2. "How Great is the Impact of GMOs on Organic?" The Non-GMO Report, June 2005. 3. "Poll: Many Won't Buy Genetically Modified Food." www.cbs2chicago.com, May 11, 2008. 4. D.B. Whitman, "Genetically Modified Foods:

Harmful or Helpful?" CSA Discovery Guides, April 2000.

Published in **WholeFoods** Magazine, September 2008

DR. F.

Modern agriculture is heavily dependent on mega-farming practices where farms of thousands of acres plant one crop (monoculture) and utilize massive machinery, large amounts of herbicides, and/or pesticides, and fertilizers. During the past 3 decades genetic engineering has also entered this system and provided large scale farming with genetically engineered crops (Genetically modified organisms... GMO's) that can grow in the presence of herbicides that kill almost all plant life...except the GMO crop. The most common herbicide of this type is called Roundup. Plants that are genetically engineered to be able to grow in the presence of Roundup are called "Roundup ready".

Many farmers have become heavily dependent of Roundup ready crops and millions of tons of roundup are used each year...185 million pounds in 2007.

Wikipedia... A **genetically modified organism (GMO)** is any organism whose [genetic](#) material has been altered using [genetic engineering](#) techniques. GMOs are the source of [genetically modified foods](#) and are also widely used in scientific research and to produce goods other than food. The term GMO is very close to the [technical legal term](#), 'living modified organism' defined in the [Cartagena Protocol on Biosafety](#), which regulates international trade in living GMOs (specifically, "any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology").

This article focuses on what organisms have been genetically engineered, and for what purposes. The article on [genetic engineering](#) focuses on the history and methods of genetic engineering, and on applications of genetic engineering and of GMOs. Both articles cover much of the same ground but with different organizations (sorted by organism in this article; sorted by application in the other). There are separate articles on [genetically modified crops](#), [genetically modified food](#), [regulation of the release of genetic modified organisms](#), and [controversies](#).

Lab equipment.com

Monsanto Co. says it will pay nearly \$2.4 million to settle a dispute with farmers in the Pacific Northwest over genetically modified wheat. No genetically engineered wheat has been approved for U.S. farming, but it was found in Oregon in 2013. That discovery prompted Japan and South Korea to temporarily suspend some wheat orders, and the European Union called for more rigorous testing of U.S. shipments. Agriculture Department officials said the modified wheat discovered in the Oregon field is the same strain as a genetically modified wheat that was designed to be herbicide-resistant and was tested by seed giant Monsanto a decade ago but never approved. St. Louis-based Monsanto said that it is settling the case rather than pay for an extended legal battle. The company will put roughly \$2.1 million into a settlement fund to pay farmers in Washington, Oregon and Idaho who sold soft white wheat between May 30 and Nov. 30 of 2013. Monsanto will also pay a total of \$250,000 to wheat growers' associations, including the National Wheat Foundation, the Washington Association of Wheat Growers, the Oregon Wheat Growers' League and the Idaho Grain Producers Association. Representatives for the growers' groups could not be reached immediately for comment. The USDA said in September that it believes the genetically modified wheat in Oregon was the result of an isolated incident and that there is no evidence of that wheat in commerce. The report said the government still doesn't know how the modified seeds got into the fields.

<http://web.mit.edu/demoscience/Monsanto/about.html>

About Roundup Ready Crops



Genetically Modified Food

Roundup Ready crops are crops genetically modified to be resistant to the herbicide Roundup. Roundup is the brand-name of a herbicide produced by Monsanto. Its active ingredient glyphosate was patented in the 1970s. Roundup is widely used by both people in their backyards and farmers in their fields. Roundup Ready plants are resistant to Roundup, so farmers that plant these seeds must use Roundup to keep other weeds from growing in their fields.

The first Roundup Ready crops were developed in 1996, with the introduction of genetically modified soybeans that are resistant to Roundup. These crops were developed to help farmers control weeds. Because the new crops are resistant to Roundup, the herbicide can be used in the fields to eliminate unwanted foliage. Current Roundup Ready crops include soy, corn, canola, alfalfa, cotton, and sorghum, with wheat under development.

Roundup Ready crop seeds have notoriously been referred to as "terminator seeds." **This is NOT true. Although Monsanto does hold the patent of terminator seeds, their seeds will germinate...but this is against the patent Monsanto owns on their seeds.** Each year, farmers must purchase the most recent strain of seed from Monsanto. This means that farmers cannot reuse their best seed.

Herbicide Resistance

One of the main concerns about genetically engineered crops such as Roundup Ready crops is the development of weeds and other plants that are also resistant to Roundup (glyphosate). An article recently published in Science Daily ([link](#)) suggests that farmers are becoming too reliant on Roundup. The use of Roundup Ready crops has become ubiquitous. This has resulted in weeds such as giant ragweed that are resistant to Roundup, when Roundup was the herbicide developed explicitly to combat these weeds. If a farmer were to grow on Roundup Ready crops, they

would have to use Roundup to treat their fields, increasing resistance to the herbicide. It is recommended that farmers rotate Roundup Ready crops with other crops and use alternate herbicides to help prevent resistance.

Risk Assessment

A big concern about genetic engineering in general, and including Roundup Ready crops, is the fact that scientists do not know what the true effect of these organisms is on the environment before releasing them. Other issues stem from the idea that changing one gene does not necessarily change just one function. A variety of changes in the expression of such a gene could occur in the resulting organism.

Big Business

Monsanto claims to be addressing the needs of the world when it comes to the food supply. However, there is little to no evidence that the use of Roundup Ready crops increases the yield or profit of farmers who use their seeds. A **press release** from the New Soil Association released in April, 2008 shows that genetically modified crops do not result in higher yields than non-genetically modified crops. Realistically, however, most genetically modified crops (including Roundup Ready) are developed to be pesticide and herbicide resistant, rather than directly increase the yield of a given crop. This makes one question whether it is even important to have herbicide resistant plants at all, or if the focus should shift to provide other advantages that do increase yield. Many argue that because Roundup Ready crops do not increase the yield or profits of farmers, they only serve to benefit Monsanto. There is little to no benefit for the consumer, but high reward for the corporation. Farmers must not only purchase new seeds from Monsanto each year, but also Monsanto's own herbicide Roundup.